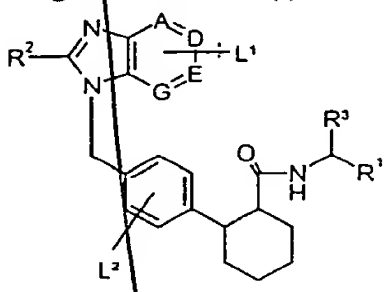
Patent claims

1. Compounds of the general formula (I)



(I),

in which

A, D, E and G are identical or different and represent CH groups or nitrogen atoms,

L1 and L2 are identical or different and independently of one another each represents one or more radicals selected from the group consisting of hydrogen, halogen, hydroxyl, carboxyl, cyano, nitro, trifluoromethyl, trifluoromethoxy, (C1-C6)-alkyl, (C1-C6)-alkoxy or (C1-C6)-alkoxy-carbonyl,

R^1 represents the CH_2-OH group, or
represents a radical of the formula $CO\text{-}NR^4R^5$

in which

R^4 and R^5 are identical or different and each represents hydrogen or $(C_1\text{-}C_6)$-alkyl,

R^2 represents $(C_3\text{-}C_8)$-cycloalkyl,
represents $(C_1\text{-}C_8)$-alkyl which is optionally interrupted by an oxygen or sulphur atom or by a radial NR^6,
represents a 4- to 8-membered saturated heterocycle which is attached to the imidazole ring via a nitrogen atom and which optionally contains a further oxygen or sulphur atom, or

represents a 4- to 8-membered saturated heterocycle which contains a radical of the formula NR^7 and optionally additionally one nitrogen, oxygen or sulphur atom,

where (C_3-C_8)-cycloalkyl, (C_1-C_8)-alkyl which is optionally interrupted by one oxygen or sulphur atom, the 4- to 8-membered saturated heterocycle which is attached to the imidazole ring via a nitrogen atom and which optionally contains one further oxygen or sulphur atom and optionally (C_1-C_8)-alkyl which is interrupted by a radical of the formula NR^6 and optionally the 4- to 8-membered saturated heterocycle which contains a radical of the formula NR^7 and optionally additionally one nitrogen, oxygen or sulphur atom are substituted by one to three hydroxyl groups and/or by a radical of the formula $-NR^8R^9$

in which

R^6 and R^7 are identical or different and each represents hydrogen, (C_1-C_6)-alkyl, hydroxy-(C_1-C_6)-alkyl or (C_3-C_7)-cycloalkyl,

R^8 and R^9 are identical or different and each represents hydrogen, (C_1-C_6)-alkyl or (C_3-C_7)-cycloalkyl,

or

R^8 and R^9 together with the nitrogen atom form a 4- to 8-membered saturated heterocycle which may optionally additionally contain one oxygen or sulphur atom or a radical of the formula NR^{10}

in which

R^{10} represents hydrogen, (C_1-C_6)-alkyl or (C_3-C_7)-cycloalkyl

and

R^3 represents a phenyl, naphthyl, pyrimidinyl, pyridyl, furyl or thienyl ring, where the rings are optionally mono- or polysubstituted by radicals selected from the group consisting of halogen, hydroxyl, carboxyl, cyano, nitro, trifluoromethyl, trifluoromethoxy, (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy or (C_1-C_6)-alkoxycarbonyl,

and their salts.

2. Compounds according to Claim 1

where

A, D, E and G each represent the CH group,

or one of the radicals A, D, E and G represents a nitrogen atom and the others each represent the CH group,

L^1 and L^2 are identical or different and independently of one another each represents one or more radicals selected from the group consisting of hydrogen, fluorine, chlorine, cyano, trifluoromethyl or trifluoromethoxy,

R^1 represents the $-CH_2-OH$ group, or
represents a radical of the formula $-CO-NR^4R^5$

in which

R^4 and R^5 are identical or different and each represents hydrogen or (C_1-C_3)-alkyl,

R^2 represents (C_3-C_7)-cycloalkyl,
represents (C_1-C_6)-alkyl which is optionally interrupted by an oxygen or sulphur atom or by a radical NR^6,
represents a 5- to 7-membered saturated heterocycle which is attached to the imidazole ring via a nitrogen atom and which optionally contains a further oxygen or sulphur atom, or

represents a 5- to 7-membered saturated heterocycle which contains a radical of the formula NR^7 and optionally additionally one nitrogen, oxygen or sulphur atom,

where (C_3-C_7)-cycloalkyl, (C_1-C_6)-alkyl which is optionally interrupted by one oxygen or sulphur atom, the 5- to 7-membered saturated heterocycle which is attached to the imidazole ring via a nitrogen atom and which optionally contains one further oxygen or sulphur atom and optionally (C_1-C_6)-alkyl which is interrupted by a radical of the formula NR^6 and optionally the 5- to 7-membered saturated heterocycle which contains a radical of the formula NR^7 and optionally additionally one nitrogen, oxygen or sulphur atom are substituted by one to three hydroxyl groups and/or by a radical of the formula $-NR^8R^9$

in which

R^6 and R^7 are identical or different and each represents hydrogen, (C_1-C_4)-alkyl, hydroxy-(C_1-C_4)-alkyl or (C_3-C_6)-cycloalkyl,

R^8 and R^9 are identical or different and each represents hydrogen, (C_1-C_4)-alkyl or (C_3-C_6)-cycloalkyl,

or

R^8 and R^9 together with the nitrogen atom form a 5- to 7-membered saturated heterocycle which may optionally additionally contain one oxygen or sulphur atom or a radical of the formula NR^{10}

in which

R^{10} represents hydrogen, (C_1-C_4)-alkyl or (C_3-C_6)-cycloalkyl

and

R^3 represents a phenyl, pyridyl or thienyl ring which is optionally mono- or polysubstituted by radicals selected from the group consisting of fluorine, chlorine, cyano, trifluoromethyl or trifluoromethoxy,

A1 cont

and their salts.

3. Compounds according to Claim 1

where

A, D and E each represent a CH group,

G represents a nitrogen atom or represents a CH group,

L^1 and L^2 each represent hydrogen,

R^1 represents a radical of the formula $-CO-NR^4R^5$,

in which

R^4 and R^5 each represent hydrogen,

R^2 represents (C_1-C_4)-alkyl which is optionally interrupted by one oxygen atom, or
represents a 4-R^7-piperazin-1-yl radical

where (C_1-C_4)-alkyl which is optionally interrupted by one oxygen atom is substituted by a hydroxyl group or by a radical of the formula $-NR^8R^9$

in which

R^7 represents hydrogen, (C_1-C_4)-alkyl or (C_3-C_6)-cycloalkyl,

R^8 and R^9 are identical or different and each represents hydrogen, (C_1-C_4)-alkyl or (C_3-C_6)-cycloalkyl,

or

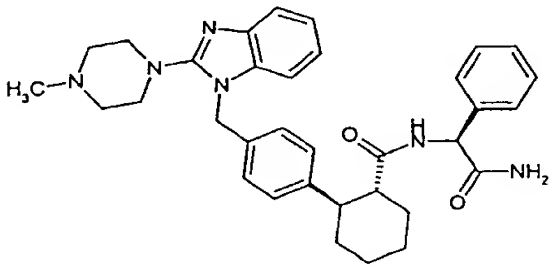
R^8 and R^9 together with the nitrogen atom form a morpholine radical,

and

R^3 represents a phenyl radical,

and their salts.

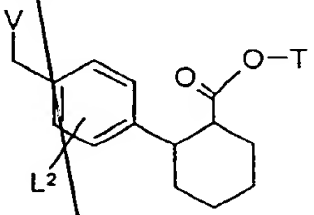
4. (*S*)-N-{{(1*R*, 2*R*)-2-{4-{[2-(4-Methyl-piperazin-1-yl)-benzimidazol-1-yl]methyl}-phenyl}-cyclohex-1-yl}carbonyl}-phenylglycinamide



and its salts.

5. Process for preparing compounds of the general formula (I) according to Claims 1 to 4, characterized in that

[A] compounds of the general formula (II)



(II),

in which

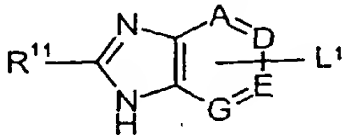
L^2 is as defined in Claim 1,

T represents (C_1-C_4)-alkyl, preferably methyl or tert-butyl,

and

V represents a suitable leaving group, such as, for example, halogen, mesylate or tosylate, preferably bromine,

is initially converted by reaction with compounds of the general formula (III)



(III),

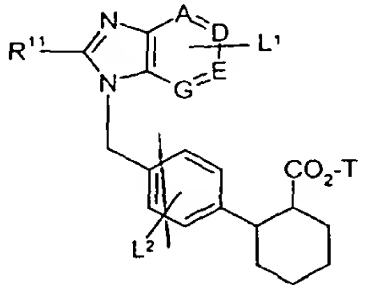
in which

A, D, E, G and L^1 are each as defined in Claim 1

and

R^{11} has the meaning of R^2 given in Claim 1, where amino and hydroxyl functions are optionally blocked by suitable amino or hydroxyl protective groups,

in inert solvents, depending on the definition of R^{11} optionally in the presence of a base, into the compounds of the general formula (IV)

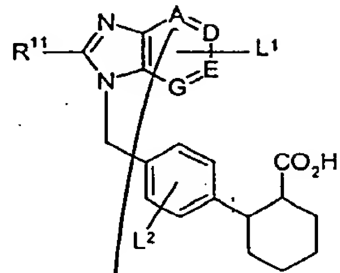


(IV),

in which

R^{11}, A, D, E, G, L^1, L^2 and t are each as defined above,

which are converted in a subsequent step using acids or bases into the corresponding carboxylic acids of the general formula (V)

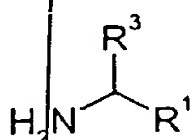


(V),

in which

R^{11}, A, D, E, G, L^1 and L^2 are each as defined above,

which are subsequently reacted by known methods with compounds of the general formula (VI)



(VI),

in which

R^1 and R^3 are each as defined in Claim 1

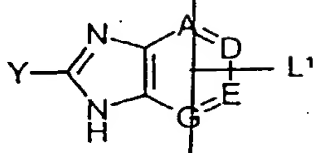
in inert solvents,

and, if R^{11} carries one of the abovementioned protective groups, these are optionally removed by customary methods either in the hydrolysis to the acids (IV) -> (V) or after the reaction with the compounds of the general formula (VI),

or

[B] if R^2 represents a saturated heterocycle which is attached directly via a nitrogen atom to the imidazole ring,

the abovementioned compounds of the general formula (II) are initially converted with compounds of the general formula (IIIa)



(IIIa),

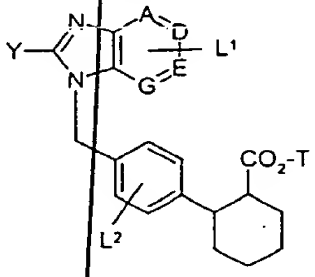
in which

A, D, E, G and L^1 are each as defined in Claim 1

and

Y represents halogen or mesyl, preferably chlorine, bromine or mesyl,

in inert solvents into the corresponding compounds of the formula (VII)



(VII),

in which

Y, A, D, E, G, L^1, L^2 and T are each as defined above,

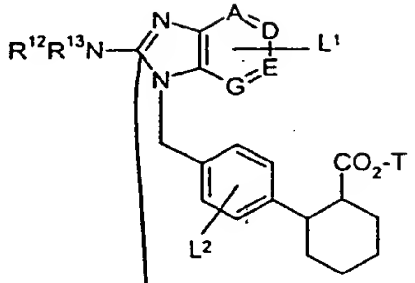
which are reacted in a subsequent step with compounds of the general formula (VIII)

$$HNR^{12}R^{13} \qquad \text{(VIII)}$$

in which

R^{12} and R^{13} together with the nitrogen atom form a heterocycle according to the definition of R^2

to give compounds of the general formula (IX)

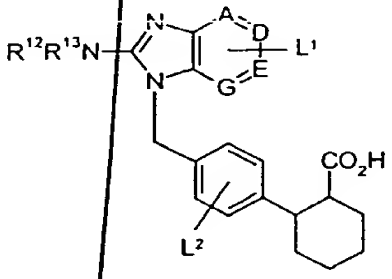


(IX),

in which

A, D, E, G, L^1, L^2, R^{12}, R^{13} and T are each as defined above,

which are, in the subsequent steps, converted as described under [A] by hydrolysis into the corresponding carboxylic acids of the general formula (X)



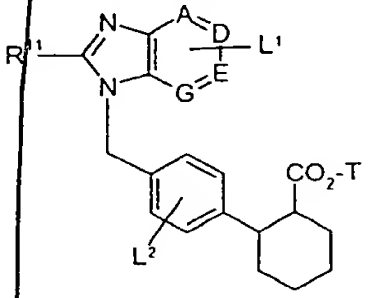
(X),

in which

A, D, E, G, L^1, L^2, R^{12} and R^{13} are each as defined above,

and these compounds are subsequently reacted with the compounds of the general formula (VI) according to known methods for preparing amides from carboxylic acids and amines and, if appropriate, converted into the corresponding salts by reaction with an acid.

6. Compounds of the general formula (IV)

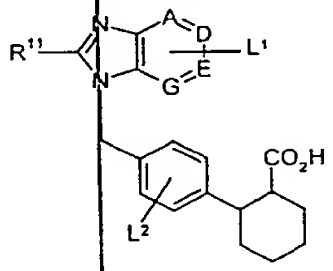


(IV),

in which

A, D, E, G, L^1, L^2, R^{11} and T are each as defined in Claims 1 and 5 and their salts.

7. Compounds of the general formula (V)

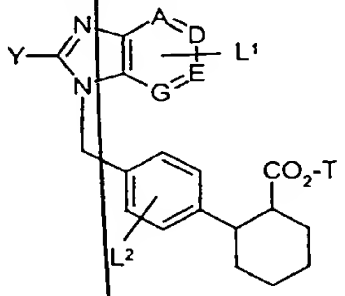


(V),

in which

A, D, E, G, L^1, L^2 and R^{11} are each as defined in Claims 1 and 5 and their salts.

8. Compounds of the general formula (VII)

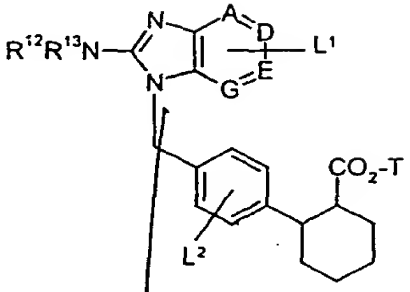


(VII),

in which

A, D, E, G, L^1, L^2, Y and T are each as defined in Claims 1 and 5 and their salts.

9. Compounds of the general formula (IX)



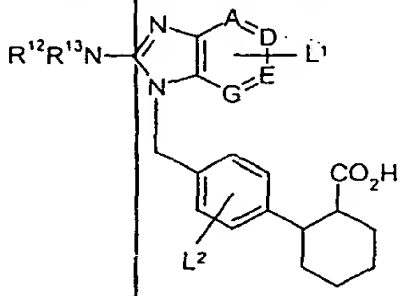
(IX)

in which

A, D, E, G, L^1, L^2, R^{12}, R^{13} and T are each as defined in Claims 1 and 5

and their salts.

10. Compounds of the general formula (X)



(X),

in which

A, D, E, G, L^1, L^2, R^{11} and R^{12} are each as defined in Claims 1 and 5

and their salts.

11. Medicaments, comprising a compound of the general formula (I) according to any of Claims 1 to 4 in admixture with at least one pharmaceutically acceptable, essentially non-toxic carrier or excipient.

12. Compounds according to any of Claims 1 to 4 for use as medicament in the treatment of humans and animals.

13. Use of compounds according to any of Claims 1 to 4 for preparing medicaments for the treatment and/or prophylaxis of ischaemic brain disorders.

14. Use of compounds according to any of Claims 1 to 4 for preparing medicaments for the treatment and/or prophylaxis of stroke, reperfusion damage or brain trauma.